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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,847	10/14/2003	Emiko Nishida	KPO10801	8433
25271 7590 01/03/2007 GALLAGHER & LATHROP, A PROFESSIONAL CORPORATION 601 CALIFORNIA ST SUITE 1111 SAN FRANCISCO, CA 94108			EXAMINER BASHORE, ALAIN L	
			ART UNIT	PAPER NUMBER
			1762	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/03/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/685,847

Applicant(s)

NISHIDA ET AL.

Examiner

Alain L. Bashore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication; even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4 and 5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4 and 5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/891,054.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

DETAILED ACTION

Election/Restrictions

The preliminary amendment filed 10-14-03 is hereby acknowledged canceling claims 1-3. The previous restriction required in hereby withdrawn as moot.

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

"1", "nL", "dE", "nI", and "n2" in Figure 6, and "14M" in Figures 15 and 16B.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The disclosure is objected to because of the following informalities:

Page 11, line 20: The phrase, "Optimize thickness each layer so that..." appears to contain a typographical error (i.e., the word "of" appears to be missing from between the words "thickness" and "each").

Page 11, lines 22 - 24: The phrase, "determine the wavelength of monitor light so that the transmittance of the interim multilayer film with that layer as the outermost layer, and store the thus determined wavelength in a memory" is unclear and confusing. Specifically, it is unclear what the phrase, "so that the transmittance of the interim multilayer film with that layer as the outermost

layer" means or refers to.

Page 12, lines 26 and 27: The phrase "memory 14" appears to contain a typographical error. It appears as though the aforementioned phrase should read "memory 14M" in order to correspond to Figures 15 and 16B.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 4-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding independent Claim 4 (from which Claim 5 depends), the phrase, "is determined by its optimization in the neighborhood of $1/4$ " is unclear and renders the scope of Claims 4-5 vague and indefinite. Specifically, it is unclear what optical thickness values are encompassed by the limitation "in the neighborhood of $1/4$ " (i.e., how close does an optical thickness value have to be to $1/4$ to be considered to be "in the neighborhood of $X/4$ "?). The term "in the neighborhood" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite

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degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the claimed invention.

The word "oriente" in claim 4 appears to be a misspelling of "oriented".

The term "main" unit is vague and indefinite because the term "main" appears to imply a secondary unit not claimed.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cushing in view of Besset et al. ("Synthesis and research of the optimum conditions for the optical monitoring of non-quarter-wave multilayers", Applied Optics, 1993) and Uetsuki et al.

Regarding independent Claim 1, Cushing teaches a method for producing / designing an optical multilayer filter having a predetermined number of layers in which the optical thickness of each of said layers of a ;L/4-oriente structure is determined by its optimization to a value of either X/4 or a value around X/4 (Abstract, Co1.1, lines 5 - 10 and 58 - 67, Col.2, lines 1 - 31, Col.3, lines 1 - 60,

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Col.4, lines 16- 22 and 56- 67, Examples 1 -4, and Tables 1 -4). Specifically, Cushing teaches that the multilayer filter is made up of many alternating layers of high-refractive index (e.g., titanium oxide, tantalum pentoxide, etc.) and low- refractive index (e.g., silicon oxide, silicon dioxide, etc.) materials (Co1.3, lines 38 - 49, Examples 1 - 4, and Tables 1 - 4), and the optical thickness of each of the layers is designed and optimized to be $X/4$ for some layers and non- $X/4$ for other layers so that ripple is reduced in a secondary passband of the multilayer optical bandpass filter (Col.1, lines 5- 10, Co1.2, lines 3- 31, Col.4, lines 16 -22 and 56- 67, and Tables 1 - 4).

Cushing does not explicitly teach:

a variable wavelength light source for emitting variable wavelength of monitor light,

wavelength setting means for setting the wavelength of monitor light to be emitted from a variable wavelength light source to the determined wavelength at the time of forming each layer so that the transmittance or reflectivity of an interim multilayer film with each layer formed as the outermost layer reaches an extreme value,

optical thickness monitor for detecting transmitted light through or reflected light by the interim multilayer irradiated with the monitor light, and deciding whether the detected output has reached an extreme value,

control device for effecting control to stop the formation of each layer when it is decided that the extreme value has been reached, and repeatedly performing the aforementioned steps to form the predetermined number of layers.

Besset et al. teaches that, in the art of making multilayer optical filters comprising alternating layers of high- and low-refractive index materials such as TiO_2 or Ta_2O_5 and SiO_2 , respectively, in which some of the layers are non-quarterwave (i.e., filters such as those taught by Cushing), the desired thickness of each layer can be obtained by (1) determining the wavelength of monitor light for each layer of optimized thickness so that the transmittance or reflectivity of each subsequently deposited layer reaches an extreme value (i.e., a max or min), (2) monitoring the transmittance for the chosen wavelength, and (3) stopping the deposition of each layer when the correct thickness is reached (Abstract, pages 5612 - 5615 and 5618, and Table 1).

Uetsuki et al. teaches an optical monitoring system and process that is specifically designed to successfully control the deposition of multiple layers on a substrate so that some of the layers have an optimized non-quarterwave thickness (Col.5, lines 61 - 67, and Co1.2, lines 1 - 32 and 60 - 64). The deposition / monitoring process of Uetsuki et al. comprises the steps of (1) determining the wavelength of monitor light for each layer of optimized thickness so that the transmittance or reflectivity of an interim multilayer film with each layer formed as the outermost layer

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reaches an extreme value, (2) setting the wavelength of monitor light to be emitted from a variable wavelength light source to the determined wavelength at the time of forming each layer, detecting transmitted light through or reflected light by the interim multilayer irradiated with the monitor light, and deciding whether the detected output has reached an extreme value, (3) stopping the formation of each layer when it is decided that the extreme value has been reached, and (4) repeatedly performing the aforementioned steps to form the predetermined number of layers (Abstract, Figures 1,2, and 4, Co1.1, lines 6 - 10, Col.3, lines 9 - 24, Col.5, lines 61 - 67, Col.6, lines 1 - 32, and 55 - 64, Col.7, lines 3 - 60, Col.9, lines 19 - 55, and Co1.17, lines 24 - 46). Uetsuki et al. teaches that the aforementioned monitoring / deposition process permits optical thickness compensation to meet the design parameters and provides the optical designer with a significant advancement in the art (Co1.6, lines 60 - 64).

Therefore, it would have been obvious to one of ordinary skill in the art to utilize: a variable wavelength light source, wavelength setting means, optical thickness monitor, control device for effecting control to stop the formation of each layer when it is decided that the extreme value has been reached, and repeatedly performing the aforementioned steps to form the predetermined number of layers because of what is taught by Uetsuki et al and Bessert et al.

Bessert et al. Teaches that a such a variable wavelength monitoring system can be utilized to control the deposition of alternating high- and low-refractive index layers

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in a multilayer filter deposition process, and (2) obtaining the benefits of using the monitoring / deposition process taught by Uetsuki et al., such as the ability to deposit both quarterwave and non-quarterwave layers and form a multilayer coating in which each layer has an optimized optical thickness, as desired by Cushing. In other words, since the combination of Uetsuki et al. and Besset et el. teaches an optical monitoring system / method that is specifically designed to deposit multilayer optical films in which some layers are quarterwave and others are non-quarterwave, it would have been obvious to use such a method to deposit the optimized multilayer films of Cushing (i.e., multilayer filters in which some layers are quarterwave and others are non-quarterwave).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alain L. Bashore whose telephone number is 571-272-6739. The examiner can normally be reached on about 7:30 am to 5:00 pm (Mon. thru Thurs.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Alain L. Bashore
Primary Examiner
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